

REMARKS

I. INTRODUCTION

Claims 10, 24 and 38 have been cancelled, without prejudice. Claims 1, 15 and 29 have been amended above merely to clarify the subject matter recited therein and to include the subject matter of now-cancelled claims 10, 24 and 38, respectively, and pursuant to the discussion between the Examiner and Applicant's attorney regarding the present application on March 15, 2007. Claims 43-45 have been amended merely to conform the recitations of these claims to those of claims 1, 15 and 29, respectively. New claims 46-51 have been added to recite additional subject matter. Accordingly, claims 1-9, 11-24, 25-37 and 39-51 are now under consideration in the above-referenced application. Provided above, please find a claim listing indicating the cancellation of claims 10, 24 and 38, the amendments to claims 1, 15, 29 and 43-45 and the addition of new claims 46-51 on separate sheets so as to comply with the requirements set forth in 37 C.F.R. § 1.121. It is respectfully submitted that no new matter has been added.

II. REJECTIONS UNDER 35 U.S.C. §§ 102 AND 103(a) SHOULD BE WITHDRAWN

Claims 1, 3, 6-13, 15, 17, 20-27, 29, 31, 34-41 and 43-45 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,016,047 issued to Notten et al. (the "Notten Patent"). Claims 2, 4, 14, 16, 18, 28, 30, 32 and 42 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Notten Patent, in view of U.S. Patent No. 5,767,659 issued to Farley (the "Farley Patent"). Claims 5, 19 and 33 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Notten Patent and the Farley Patent, in view of U.S. Patent No. 5,889,385 issued to Podrazhansky et al. (the "Podrazhansky Patent"). Claims 14, 28 and 42 stand rejected under 35 U.S.C. § 103(a) as being also unpatentable over the Notten Patent, in view of U.S. Patent No. 6,188,202 issued to Yagi (the "Yagi Patent"). Applicant respectfully submits that the Notten

Patent, taken alone or in combination with the Farley Patent, the Podrazhansky Patent or the Yagi Patent, do not teach, suggest or disclose the subject matter recited in amended independent claims 1, 15 and 29, and the claims which depend therefrom. Thus, it is respectfully requested that the 35 U.S.C. §§ 102 and 103(a) rejections of these claims be withdrawn for at least the reasons set forth herein below.

In order for a claim to be rejected as anticipated under 35 U.S.C. § 102(b), each and every element as set forth in the claim must be found, either expressly or inherently described, in a single prior art reference. Manual of Patent Examining Procedure §2131; *also see Lindeman Maschinenfabrik v. Am Hoist and Derrick*, 730 F.2d 1452, 1458 (Fed. Cir. 1984).

In order for a claim to be rejected for obviousness under 35 U.S.C. § 103, not only must the prior art teach or suggest each element of the claim, the prior art must also suggest combining the elements in the manner contemplated by the claim. *See Northern Telecom, Inc. v. Datapoint Corp.*, 908 F.2d 931, 934 (Fed. Cir.), *cert. denied* 111 S.Ct. 296 (1990); *see In re Bond*, 910 F.2d 831, 834 (Fed. Cir. 1990). "It is improper to use the inventor's disclosure as a road map for selecting and combining prior art disclosures." *See Grain Processing Corp. v. American Maize-Products Corp.*, 840 F.2d 902, 907 (Fed. Cir. 1988). "[T]he reference must be viewed without the benefit of hindsight afforded to the disclosure." *In re Paulsen*, 30 F.3d 1475, 1482 (Fed.Cir. 1994). The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicant's disclosure. *See In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991).

The Notten Patent relates to a battery management system which includes input means for receiving input signals representative of a physical quantity of a battery and processing

means for calculating at least one physical quantity of the battery at least partially based on the input signals and a battery temperature; and for generating an output signal derived from the calculated physical quantity. The Notten Patent also describes a battery charger/discharger including a battery management system. (See Notten Patent, Abstract). As described in the Notten Patent, the battery management system 100 of FIG. 2 controls the battery charger 200 by maintaining the battery temperature substantially at a predetermined temperature curve. In a simple form, the battery temperature is maintained at a constant temperature of, for instance, 30°C. Alternatively, the battery temperature is maintained at a predetermined offset, for instance 10°C., related to the ambient temperature. (See *id.*, col. 26, lns. 6-17).

The described simulation tool of the Notten Patent can be used to design an optimum temperature curve for a specific application and operating environment. It will be appreciated that any conventional control loop may be used to control the battery charger 200 in such a way that the battery temperature substantially matches the predetermined temperature curve. The current or voltage level supplied by the battery charger 200 may be controlled by the control loop. Alternatively, the battery charger 200 may use a pulsed-voltage or pulsed-current charging scheme, where the control loop controls, for instance, the pulse duration and/or pulse shape. Obviously also suitable combinations of the charging schemes may be used. The battery management system 100 uses the calculated battery temperature for accurately controlling the battery charger 200. It will be appreciated that in a simple embodiment, the battery management system 100 may use a measured battery temperature to control the battery charger 200. (See *id.*, col. 26, lns. 18-35).

The Notten Patent states that its FIG. 8a shows that the battery voltage increases at higher charging currents due to the higher potential drop. (See *id.*, col. 26, lns. 65-67; and Fig. 8a).

The temperature development during charging is allegedly shown in FIG. 10a of the Notten Patent. The temperature becomes higher at higher currents. According to the Notten Patent, the strongest temperature rise occurs when the pressure starts to level off. This is due to the large heat contribution of the oxygen recombination reaction, which occurs at an overpotential of 1.2 V. (See *id.*, col. 27, lns. 30-35; and Fig. 10a).

The Farley Patent relates to a battery pack including a component in which predetermined battery parameters definitive of a battery pack characteristic may be stored, together with a battery parameter sensor. (See *id.*, Abstract). In particular, the arrangement of the Farley Patent uses a processor that monitors cell temperature with time. For example, temperature measurements are logged at intervals such as each 5-10 seconds, and when a profile which matches a stored profile indicative of substantially full charge is identified, the transistor may be switched to shunt the charging current. The battery pack temperature may then rise due to the heat dissipated in a resistor R enabling the simple full charge detection by temperature of the battery charger to operate to end or shut-off the fast charge current in appropriate charger types. The processor of the Farley Patent may be arranged such that this overcharge protection occurs only when the temperature rise is due to the charging current (i.e. flow into the cells). (See *id.*, col. 5, lns. 35-51; and col. 19, lns. 50-60).

As shown in Fig. 8b of the Farley Patent, the cell temperature is read and stored so that a profile of cell temperature with time may be built up. If the cell temperature is within the range (step 89) for which fast charging is appropriate, then the cell temperature profile established to date is examined to see if the profile is equivalent to that of a full charged cell array (step 800). If not, after a pause of 1 minute and assuming the timer which has set the fast charging time limit

before current shunting is to be applied has not expired (801), control loops back to a point label (a) where a portion of the aforesaid control regime is repeated. An outcome of this iteration is that repeated samples of cell temperature with time are stored and a profile built up which will eventually equate with the full charge profile (at step 800). An adjustment to the assumed charge state (i.e., 90% charged which is also known as profile) may be made to account for temperature. Whether full charge was reached or not, the current charge level, based on the charging which has occurred applied to the previously stored battery charge status, is displayed. At this point when the battery is fully charged (at step 805), the current shunting transistor is switched on so that only a trickle current remains at the cell terminals. (See *id.*, col. 10, lns. 1-27; and Fig. 8b).

Applicant's invention, as recited in amended independent claim 1, relates to battery charger configured to provide a temperature-regulated charging of a battery, which comprises the steps of, *inter alia*:

a processing arrangement operable to:

- (a) obtain a temperature data associated with the battery; and
- (b) apply a particular amount of a charge to the battery based on the temperature data of the battery, wherein ... the battery [is maintained] at a **predetermined threshold temperature during an entire time period in which the charge is applied to the battery, and ... the particular amount of the charge [is regulated] to be at least one of gradually increased or gradually reduced during the time period.**

Amended independent claims 15 and 29 relate to process and storage medium, respectively, which recite similar subject matter.

It is again respectfully asserted that in clear contrast to Applicant's claimed invention, the Notten Patent fails to teach, suggest or disclose the battery charger, method and storage medium in which **the battery is maintained at a predetermined threshold temperature during an entire**

time period in which the charge is applied to the battery, and the particular amount of the charge is regulated to be at least one of gradually increased or gradually reduced during such time period, as recited in amended independent claims 1, 5 and 29 of the above referenced application.

In the latest Office Action, with regard to now-cancelled claims 10, 24 and 38 (the subject matter of which has now been included in amended independent claims 1, 15 and 29, respectively), the Examiner points to Figs. 8a and 10a and col. 26, lns. 50-64 of the Notten Patent as allegedly disclosing the regulation of the particular amount of the charge to be at least one of gradually increased or gradually increased. (See Office Action dated December 15, 2006, p. 4, lns. 6-8). However, these figures and sections of the Notten Patent only describe and indicate that “[t]he battery voltage of the charging curves shown in FIG. 8a stairs at a value of about 1.3 V and then gradually increases.” (Notten Patent, col. 26, lns. 52-54). Thus, the Notten Patent only references a gradual increase of the battery voltage, but provides absolutely *no disclosure of any gradual increase and/or gradual increase of the charge (or current) being applied to the battery*, much less that such gradual increase/decrease of the charge occurs during the entire time period in which the charge is applied to the battery. While the Notten Patent mentions that the current or voltage level supplied by the battery charger 200 may be controlled by the control loop, there is absolutely no mention, much less any *enabling disclosure of gradually increasing and/or gradually decreasing the charge being applied to the battery during the entire time period in which the charge is applied to the battery*, as recited in amended independent claims 1, 15 and 29 of the above-identified application.

Further, during the latest interview with the Examiner, the Examiner relied on Fig. 10a of the Notten Patent as allegedly showing the use of a charge of 0.1A to provide a substantially

level temperature. (See Notten Patent, Fig. 10a). However, as it is known that the charge of 0.1A applied to the battery is a trickle charge, the use of the trickle charge is not a reliable way to maintain the temperature of the battery in any active manner. In fact, such trickle charge can be small enough so as to reduce the temperature of the battery, while still maintaining the charge of the battery, and thus no maintenance of the temperature is being performed.

Accordingly, for at least the above described reasons, Applicant respectfully asserts that the Notten Patent does not disclose **the battery is maintained at a predetermined threshold temperature during an entire time period in which the charge is applied to the battery, and the particular amount of the charge is regulated to be at least one of gradually increased or gradually reduced during such time period**, as recited in amended independent claims 1, 5 and 29. The Farley Patent, the Podrazhansky Patent and the Yagi Patent do not cure at least these deficiencies of the Notten Patent, and the Examiner does not contend that they do.

Therefore, Applicant respectfully submits that the Notten Patent, taken alone or in combination with the Farley Patent, the Podrazhansky Patent or the Yagi Patent, fail to teach, suggest or disclose the subject matter recited in amended independent claims 1, 15 and 29. The claims which depend from these independent claims are also believed to be allowable over the Notten, Farley, Podrazhansky and Yagi Patents for at least the same reasons as set forth herein above with respect to amended independent claims 1, 15 and 29.

Thus, for at least these reasons, the 35 U.S.C. §§ 102(b) rejection of independent claims 1, 15 and 29, and the §§ 102(b) and 103(a) rejections of the claims which depend there from should be withdrawn. In addition, it is believed that various claims which depend from independent claims 1, 15 and 29 are also allowable over the alleged combination of the Notten, Farley,

Podrazhansky and Yagi Patents for at least the same reasons, as well as contain separately patentable subject matter as set forth herein above.

III. NEW CLAIMS 46-51

New claims 46-51 have been added as indicated herein above. Support for these new claims can be found throughout the specification, original-filed claims and drawings. Applicant respectfully submits that the new claims are patentable over the prior art of record. A confirmation that these new claims are indeed patentable over such prior art of record is respectfully requested.

IV. CONCLUSION

In light of the foregoing, Applicant respectfully submits that all pending claims 1-9, 11-24 , 25-37 and 39-51 are in condition for allowance. Prompt consideration, reconsideration and allowance of the present application are therefore earnestly solicited.

Respectfully submitted,

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